

**INCREASING THE USE OF RENEWABLE SOURCES OF ENERGY, AND  
REDUCING THE CARBON FOOTPRINT OF THE CAPITOL COMPLEX**

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WEDNESDAY, JUNE 18, 2008

United States Senate,  
Committee on Rules and Administration,  
Washington, D.C.

The Committee met, pursuant to notice, at 10:07 a.m., in Room SR-301, Russell Senate Office Building, Hon. Dianne Feinstein, Chairman of the Committee, presiding.

Present: Senators Feinstein and Bennett.

Staff Present: Howard Gantman, Staff Director; Jennifer Griffith, Deputy Staff Director; Adam Ambrogi, Counsel; Lynden Armstrong, Chief Clerk; Carole Blessington, Assistant to the Majority Staff Director; Justin Perkins, Staff Assistant; Joshua Brekenfeld, Professional Staff Democratic; Mary Jones, Republican Staff Director; Shaun Parkin, Republican Deputy Staff Director; Abbie Platt, Republican Professional Staff; Rachel Creviston, Republican Professional Staff; and Mark Neilson, Intern.

**OPENING STATEMENT OF CHAIRMAN FEINSTEIN**

Chairman Feinstein. Good morning, everybody. I am going to begin the hearing. I know Senator Bennett is on the way, but in the interest of time and everybody here so quiet and still, I think I will just begin.

I would like to welcome our witnesses here this morning. Obviously, we are here to discuss ways in which the Senate community has reduced energy uses in the Capitol and to explore options to do more.

I think we all know that global warming is not a distant threat. It is here, and we see it in so many ways: less water, more volatile weather patterns, diminishing ice, all of the above. But the Energy Independence and Security Act of 2007 requires that the Capitol Complex reduce energy consumption 30 percent by 2015. Now, that is a challenge, so we need to look to find projects that are cost effective, good use of Federal dollars, and we must also weigh the importance of implementing environmentally sustainable initiatives against other pressing maintenance issues around the Capitol Complex.

Good morning.

Senator Bennett. Good morning.

Chairman Feinstein. I have just begun, and thank you.

There are substantial inherent obstacles in working with the greening of old and historic buildings, and I recognize that. For example, this Russell Senate Building will be 100 years old next year. So how do we find ways to preserve this building while still decreasing energy consumption?

Now, the Senate has put in place a number of energy reduction projects, and I want to just quickly tick them off:

A robust recycling program that incorporates 12 different materials and produces 902 tons of recycled goods annually;

A comprehensive light bulb replacement program that has switched 99 percent of all lights in public spaces to low-wattage compact fluorescent bulbs, which has saved hundreds of thousands of dollars in energy use and over 900 tons of CO2 emissions. That is quite amazing, I think.

The installation of water reduction flush units in the Dirksen and Hart Buildings that reduce water usage per flush by 30 percent.

In May of 2007, I directed the Senate Sergeant at Arms to purchase only ENERGY STAR-rated equipment for all information technology needs. This initiative has resulted in the use of over 3,300 new ENERGY STAR computers.

In January of 2008, I directed the Architect of the Capitol to require ENERGY STAR-rated vending machines throughout the Senate. Currently, there are over 70 ENERGY STAR units in usage. And I understand that the Acting Architect of the Capitol in his opening remarks will

address other energy-saving projects that the Senate has implemented.

So we have come a substantial distance to achieving some sustainability goals, but there is much more that can be done. One avenue for change is altering the fuel mixture at the Capitol Power Plant. According to the GAO, 32 percent of all greenhouse gases produced by the legislative branch come from the Capitol Power Plant's operations. Right now, the power plant uses a mixture of coal, natural gas, and oil to produce steam and chilled water to 23 different buildings, including the Senate buildings. This morning I intend to ask Stephen Ayers, the Acting Architect, to look into whether we could reduce Senate greenhouse gas emissions at the Capitol Power Plant by changing the fuel mixture used. And I look forward to hearing his recommendations.

Another avenue for possible change is educating the Senate community on how simple actions can make a big difference in lowering our energy use. Creating a culture of energy consumption awareness through educational seminars and e-mails might hold an interesting key to further reductions. I know we all share a common commitment to create and implement ways to reduce our energy use, and I very much look forward to the testimony here this morning.

And now I would like to turn to our distinguished Ranking Member, Senator Bennett, for his remarks.

### **OPENING STATEMENT OF SENATOR BENNETT**

Senator Bennett. Thank you very much, Madam Chairman. You have covered the ground admirably, and I think we should get directly to our witnesses.

My comment, in a historic sense, is that ever since the oil shock of the 1970s, Americans have become more and more energy efficient, and the per capita use of energy in total terms has gone down fairly dramatically. We need to continue that, not rest on our laurels, and recognize that there are always certain small, incremental ways that this can continue. And you have highlighted the ways that it has been done so far in the Capitol, and I look forward to hearing our witnesses on the additional ways that we can find to go in that direction.

Thank you.

Chairman Feinstein. Thank you very much, Senator Bennett.

I would like to introduce the witnesses all at one time, which I will do proceeding from my left to my right. And I would ask them to summarize their written testimony, try to keep it as close to 5 minutes as you can so we can have some interaction with you.

The first is Terrell Dorn. Mr. Dorn joined the GAO in 2001 and is Director of Physical Infrastructure. Prior to beginning his work with the GAO, he spent 10 years as a civilian engineer with the United States Army Corps of Engineers, working on civil and military construction projects both here and in Europe.

The second witness is Stephen Ayers. Mr. Ayers has been serving as Acting Architect of the Capitol since February of 2007. In this position, he is responsible for the mechanical and structural maintenance of the United States Capitol, 450 acres of Capitol grounds, and the operation and maintenance of 16.5 million square feet of building space. Mr. Ayers also serves as the Acting Director of the U.S. Botanical Garden and the National Garden, which are under the jurisdiction of the Joint Committee on the Library.

Brendan Owens. Mr. Owens is with the U.S. Green Building Council, where he serves as Vice President in Leadership in Energy and Environmental Design Technical Development. He played a major role in creation of the LEED design for existing buildings and also managed the Conservation Program for over 100 buildings.

Jean Carroon. Ms. Carroon is a Preservation Architect for the National Trust for Historic Preservation's Sustainability Coalition. She is the author of the soon-to-be published book "Sustainable Preservation: Greening Existing Buildings," which, of course, she will provide a signed copy to this Committee for our information, which we look forward to. Ms. Carroon has received numerous awards for her work in incorporating sustainable design into construction and preservation projects.

So, Mr. Dorn, you are first up.

**STATEMENT OF TERRELL DORN, DIRECTOR, CONSTRUCTION AND FACILITIES  
MANAGEMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE, WASHINGTON,  
D.C.**

Mr. Dorn. Thank you, Madam Chair, Senator Bennett.

The Senate's options for reducing greenhouse gas emissions related to its Capitol Hill facilities operations fall into three main categories: implementing projects to reduce energy demand, adjusting the Capitol Power Plant fuel mix, and purchasing renewable energy and carbon offsets.

As with many things, the key to reducing greenhouse gas emissions is knowledge: first, knowing how Capitol operations create greenhouse gas emissions; and, second, knowing where to find the opportunities for savings. The first part is a little easier. In April 2007, we reported that fully 96 percent of Capitol Hill greenhouse gas emissions are from two sources: electricity use and the burning of coal, oil, and natural gas at the Capitol Power Plant to produce steam. Knowing where to find the savings opportunities is a lot harder and more

expensive.

To address this issue, we recommended that the AOC and other legislative branch agencies—

Chairman Feinstein. Could I interrupt you for one moment? Could somebody adjust the microphones? It is rather blurred. I find it difficult to hear him. Would you do that?

I am sorry. Please proceed.

Mr. Dorn. To address this issue, we recommended that the AOC conduct energy audits to identify projects and that they implement the projects they identify as part of an overall plan that considers cost-effectiveness, the extent to which projects reduce emissions, and funding options. AOC has made progress in this area; however, there is much that still can be done.

For example, AOC has developed a prioritized list of energy audits to be conducted and has begun conducting these audits. The method of prioritizing the audits and the schedule for completing them are unclear to us at this time, and at the current rate of funding for energy audits, it will take a number of years just to conduct the audits. We believe that if AOC develops a more detailed schedule and cost estimates for conducting the audits, they could better assist Congress in its funding decisions.

Out of these energy audits will come a list of projects that AOC can then prioritize and implement to reduce both energy demand and greenhouse gas emissions. While some of these projects may be capital-intensive, AOC has the option to fund them through energy savings performance contracts if direct appropriations are insufficient. In addition, the emissions reductions and the energy conservation realized from these projects will continue for the useful life of the projects unlike the other two categories mentioned before.

Adjusting the fuel mix of the Capitol Power Plant can help reduce Congress' carbon footprint because natural gas only produces about half as much carbon dioxide as coal when burned. Unfortunately, it also costs about 4 times as much for a comparable amount of energy input. Earlier this year, we estimated that switching from coal to natural gas—

Chairman Feinstein. I am sorry. Could you repeat that "costing 4 times as much" sentence, please?

Mr. Dorn. Yes. I said unfortunately it costs about 4 times as much to burn natural gas at the Capitol Power Plant as it does for coal based on the amount of energy that you get out of the two energy sources.

Earlier this year, we estimated that switching from coal to natural gas costs about \$139 per ton of carbon dioxide saved. Fuel switching would impose a recurring additional fuel cost

on AOC and may prove less cost effective than implementing projects that decrease the demand for energy. Above a certain level, fuel switching would also require installing a new boiler at the Capitol Power Plant.

Finally, to reduce its carbon footprint, the AOC could pay for electricity derived from renewable sources or purchase carbon offsets. In the last year, AOC has purchased renewable energy and carbon offsets. Such steps could encourage development of renewable energy and could encourage reduction of greenhouse gas emissions outside of the Capitol Complex, while, like fuel switching, they would also impose a recurring cost on the AOC and they may be less cost effective than decreasing the demand for energy.

In summary, opportunities for the Senate to improve energy efficiency and reduce greenhouse gas emissions on Capitol Hill fall into three categories, all of which can be pursued at the same time: first, reducing energy demand through conducting energy audits and implementing projects, many of which will pay for themselves; second, adjusting the fuel mix at the Capitol Power Plant; and, third, purchase of renewable energy and carbon offsets. The last two options would require funding to maintain the reduction in greenhouse gas emissions. Completing the energy audits can provide the information needed to know which of the three options may be most cost effective.

Thank you for the opportunity to appear here today, and I am prepared to answer any questions from the Committee.

[The prepared statement of Mr. Dorn follows:]

Chairman Feinstein. Thank you very much.  
Mr. Ayers?

## **STATEMENT OF STEPHEN T. AYERS, ACTING ARCHITECT OF THE CAPITOL, WASHINGTON, D.C.**

Mr. Ayers. Thank you, Madam Chairman and Senator Bennett, for inviting me here today to discuss the AOC's efforts over the past several years to improve energy efficiency and reduce the carbon footprint of the U.S. Senate and the entire Capitol Complex. Most importantly, the AOC is complying with the requirements and goals of the Energy Policy Act of 2005, and the Energy Independence and Security Act of 2007, as well as the Green the Capitol Initiative. The Energy Policy Act requires us to increasingly reduce energy consumption per gross square foot per year in fiscal years 2006 through 2015. The AOC exceed the goal of 2 percent by reducing energy consumption by 6.5 percent in 2006. In addition, for 2007, we achieved a total cumulative reduction of 6.7 percent over the 2003 baseline.

Over 60 percent of the Capitol Complex's carbon footprint comes from the generation of electricity that we purchase from Pepco. Accordingly, our top strategic priority must be to

reduce energy consumption across the Hill. We are able to exceed our energy reduction goals through a variety of projects and pilot programs. For example, we have installed dimmable lighting ballast systems with daylight and occupancy sensors in overhead lighting in Senate offices. We are replacing conventional light bulbs with compact fluorescent bulbs across the Capitol campus. And we have installed modern heating and cooling systems throughout the complex as well. In addition, we have implemented procurement policies that establish our preference for the use of bio-based products and the purchase or lease of alternative fuel vehicles.

Another 30 percent of the Capitol's carbon footprint is the result of steam production at the Capitol Power Plant to heat and humidify the 23 facilities across the complex. We have taken several steps to reduce energy consumption at the plant and specifically have focused on installing new energy-efficient equipment, upgrading control systems, reducing steam pressures, and improving our condensate return system.

To further identify energy-saving opportunities, we are auditing the energy consumption of our facilities and are working to add new steam and chilled water meters to all buildings to monitor actual energy usage. We have incorporated standards from the LEED green building rating system in our design standards and are using energy savings performance contracts to increase building energy efficiency, upgrade infrastructure, and we manage a robust recycling program throughout the Capitol Complex. In 2007, we recycled approximately 2,300 tons of paper from the House and Senate office buildings, and as the Chairman noted, 993 tons of material was recycled in 2007 in the Senate alone, representing a 15-percent increase from the previous year.

Over the past several years, the Senate has been proactive in its energy-saving efforts, and the following is a short list of Senate projects and initiatives.

We have installed more than 4,000 compact fluorescent light bulbs. We have installed or started a dimmable ballast lighting program in 11 Senate and Committee offices, and we are currently designing the system for another 10 member offices. This pilot program has been extremely successful and saves about 12,000 kilowatt hours per week, or 40 percent of the lighting energy used in each of the offices.

We have selected a renewable solar energy source for lighting Parking Lot 18 across from the Dirksen Building, which we will be installing this fall. And we have installed bi-level lighting in the Hart emergency stairwells and are dimming the cove lights in the hallways of the Dirksen Building when possible.

The AOC is working with two energy-saving performance contractors, and we plan to utilize these ESPCs to achieve a portion of the required energy reductions because these contracts allow us to initiate energy-saving contracts with little up-front appropriated funding.

To ensure that our efforts save energy and save taxpayer dollars, we are planning to conduct additional energy audits. To date, energy audits have been performed or are being performed on five Capitol Complex facilities, and the goal is to perform energy audits on all buildings on a 5-year rotating schedule as funding permits. This year, we have received \$400,000, and we will be conducting two new audits this summer. In fiscal year 2009, we have requested \$1.4 million to continue this energy audit program.

Madam Chairman, we need to ensure that projects we choose to invest in are fiscally responsible, energy efficient, preserve the historic integrity of these landmark buildings, and have minimal adverse effects on the building occupants, local community, or Congressional operations.

In addition to using and installing new and modern energy-efficient technologies, other changes will need to happen in order to realize additional savings. These include changes in behavior and practices by building occupants and modifying building operations and methods.

Again, I would like to thank the Committee and the Congress for their leadership on this issue, and I would be happy to answer any questions the Committee may have.

[The prepared statement of Mr. Ayers follows:]

Chairman Feinstein. Thank you very much, Mr. Ayers. I appreciate the comments. Mr. Owens?

**STATEMENT OF BRENDAN OWENS, VICE PRESIDENT, LEED TECHNICAL DEVELOPMENT, U.S. GREEN BUILDING COUNCIL, WASHINGTON, D.C.**

Mr. Owens. Thank you. On behalf of the U.S. Green Building Council, our almost 16,000 organizational members, 77 local chapters, and 150 professional staff, I would like to thank Chairman Feinstein and Ranking Member Bennett for the opportunity to testify about the role that green buildings can play in improving the energy efficiency and overall sustainability of the Capitol Complex. My name is Brendan Owens, and I am a Vice President with U.S. Green Building Council.

The U.S. Green Building Council is a national 501(c)(3) nonprofit organization, and we work to address climate and energy challenges by advancing more environmentally responsible, healthy, and profitable buildings. The council was founded in 1993 in recognition of and commitment to proactively address the reality that 39 percent of U.S. primary energy, 12 percent of our potable water, and 40 percent of all raw materials produced globally are used to build and operate buildings. In addition, buildings are responsible, as we have already talked about, for almost 40 percent of annual U.S. carbon emissions.

Simply put, buildings have an extraordinary environmental impact and, as such, they have--an extraordinary opportunity exists within the operations and maintenance of these

buildings to reduce their environmental footprint. So we can and should be doing better.

One of the principal tools that USGBC has developed to address and mitigate the environmental impact of buildings is the LEED green building rating system. LEED is a voluntary consensus, third-party building certification system developed to provide the buildings industry with a measurable industry consensus definition for green building and industry leadership. Originally launched in 2001, LEED has become the de facto industry definition for green building achievement, and nearly 4 billion square feet of building projects have been either certified to LEED requirements or are currently in the process of completing the requirements for certification.

LEED provides an integrated framework around which project teams can optimize all aspects of the performance of a building. LEED requires project teams to address and optimize siting and location issues, water and energy use, natural resource and material use, and optimization of the indoor environment for the people who live and work in buildings.

LEED also intrinsically recognizes the value of historic and culturally important buildings and neighborhoods. By recognizing and valuing many of the aspects that make existing and historic buildings important, LEED actively supports preservation activities. In addition, through the partnership that USGBC is in the process of forming with the National Trust for Historic Preservation, we are working collaboratively to increase the level of recognition awarded to components of existing and historic buildings throughout the LEED rating system, greatly enhancing our hope--the relative importance of preservation activities nationally.

In addition to addressing the design and construction life span of a building project, LEED for existing buildings' operations and maintenance provides a framework and a set of guidelines that addresses all aspects of building operations. LEED existing buildings' operations and maintenance highlights opportunities to optimize the use of energy, water, materials, and natural resources and, in addition, provide a quality indoor environment for building occupants.

Additionally, the integrated framework established in LEED for existing buildings can also be used to uncover operating inefficiencies and establish a plan for reporting, inspecting, reviewing, and maintaining peak performance over an optimal indoor environment throughout the building's life span.

There are many specific opportunities that the Capitol Complex has already undertaken--and they have been detailed in previous testimony--to optimize the ongoing operation throughout the complex. Individually, these lighting efficiency upgrades, water efficiency upgrades, materials procurement policies, and HVAC upgrades, which are going to be undertaken, I am assuming, through the performance contracts that are currently being scoped out, improve the overall efficiency of individual systems. And they are excellent opportunities to reduce the environmental foot print of the Capitol Complex.

The real power of using an integrated planning framework, which is what LEED allows and encourages project teams to do, is that the framework can then be used to think about ideas in an integrated fashion and in an integrated manner. It is in the optimization of the whole system that the true benefit of integrated thinking is realized. For example, the best and first way to reduce the carbon footprint of the Capitol Complex is in looking at the efficiency of the existing buildings and reducing the amount of power that needs to be brought in, thereby reducing the carbon footprint.

Because USGBC is at the nexus of the green building world in and around these areas, I feel that we are uniquely positioned to organize under the leadership of the Capitol Complex operations and maintenance staff, technical support to assist in the development of a long-term, operationally focused greening plan for the Capitol Complex.

The USGBC looks forward to the discussion going forward, and I am happy to answer any questions. Thank you very much.

[The prepared statement of Mr. Owens follows:]

Chairman Feinstein. Thank you very much. I appreciate it.  
Let's see. Our final witness, Ms. Carroon, welcome.

**STATEMENT OF JEAN CARROON, PRESERVATION ARCHITECT, NATIONAL TRUST FOR HISTORIC PRESERVATION SUSTAINABILITY COALITION, WASHINGTON, D.C.**

Ms. Carroon. Thank you. Thank you, Madam Chair and Senator Bennett, for inviting me here as a representative of the National Trust for Historic Preservation. The National Trust is a private nonprofit that was chartered by Congress in 1949 to further public involvement in the issues around historic preservation and the recognition that our cultural heritage was of importance to our quality of life. With close to 300,000 individual members and eight regional field offices, it continues to be an active leader in the national historic preservation movement.

I am a preservation architect who has dedicated my career to reducing the carbon footprint of existing buildings. I have a significant advantage because existing buildings already are an existing resource. The carbon required to create a building, the impact of construction and the use of new materials, has already been expended in a building that is standing in front of us, particularly a building that already has a life of a hundred years and could easily have a life of several hundred more. So we are starting with a zero carbon footprint from construction, unlike new construction.

When we move forward with options to reduce energy use and to improve the carbon footprint, our ability to do this resides in the renewal of knowledge that comes from past generations and the incredible benefits that are coming from new technologies, new awareness, and new energy-conserving devices that are part of our building systems. With every year, we see our ability to reduce the impact of existing buildings improving and look forward to that being a recognized position within the United States and the world and feel that what the Senate is doing in this action with the Architect of the Capitol is really setting a model that makes a new statement. Rather than disposing of buildings almost as readily as we dispose of plastic cups, we can look at the 82 billion square feet that the Brookings Institution estimates will be removed and rebuilt in the next few years and consider that as an existing resource, an existing resource that we cannot afford to throw away; we need to recycle and

improve its performance.

When I walk around these halls and listen to what has already been said today and see what you are doing, I applaud everything. You have already taken the steps that we consider most crucial. You have focused on the bigger picture. You have thought about transportation. You have also focused on user positions and education and facilities. Greening is not a one-time event. It is something that is a continuing practice. As you create a green team, you cycle through, you look at the buildings again and again. You are always tweaking and improving both how people use a building and how the buildings perform for the people in them.

I would suggest that there might be some things that have not yet been thought of that your green team might look at. One of my favorite things is hoping someday to see awnings back on buildings. I have wonderful historic pictures from a hundred years ago that show awnings on some of the most significant buildings in our country. It was a standard practice for reducing heat. Heat gain is a significant contributor to the need for air conditioning. Air conditioning ties back to our electrical load and our use of coal.

So we go back and forth between looking for new mechanical opportunities, new technologies like the evolution that is happening in lighting technologies, moving from incandescents to fluorescents to light-emitting diodes that give us longer life, lower energy use, greater ability to control our use of electricity, and we use the new technologies along with the old technologies to improve how we use our buildings.

Thank you for this opportunity. The National Trust has been pleased to partner with the U.S. Green Building Council as they play a significant role, as you are, in changing the marketplace that makes this possible.

[The prepared statement of Ms. Carroon follows:]

Chairman Feinstein. Thank you very much. Now we will go to questions, but, Ms. Carroon, I just have to comment. I come from San Francisco, which has a natural air conditioning system. And I have been appalled how all these new buildings are built; the windows are all sealed. On the weekends, if you work, the air conditioning is off and the air is stagnant. No one can open a window and just use the system we have. So I find sometimes, you know, history gives us a good way to handle many of these problems without putting more energy use on use. So I thank you for the awning suggestion.

Mr. Ayers, if I may, first of all, thank you very much. I think the number of things that you have done that has increased energy efficiency by 6.5 percent in 2006 and 6.7 percent in 2007 over the 2003 baseline is really an excellent start. I did not hear you mention the CVC, the Visitors Center, which hopefully will be opening before long. But in your written comments you do mention it, and you point out that it is a real example of sustainability

principles and was designed to incorporate as many green principles as possible. Both Senator Bennett and I have had a chance to visit it, and it is truly, I think, a beautiful center, and I think will be a wonderful place of welcome for Americans visiting their Capitol. So I think you can be very proud and everybody that has worked on it can be very proud of what has been happening.

Mr. Ayers. Thank you, Madam Chairman.

Chairman Feinstein. Oh, you are very welcome. I wanted to ask this question: The Capitol Power Plant seems to be the big source of conversation with respect to what to do, and my understanding is that the House is going to move very energetically. What is the cost of what the House wants to do? And what is your belief--and I will ask this of Mr. Dorn as well, and anyone else--of what is the most cost-effective measure that can be taken with respect to the power plant.

Mr. Ayers. Well, certainly the Green the Capitol Initiative has laid out a plan for achieving carbon neutrality by the end of the 110th Congress. And to get there, part of that plan was to, or is to, reduce the burning of coal in the Capitol Power Plant for the House's equivalent of the steam generation. So we have worked with the Chief Administrative Officer to determine the amount of steam provided to all of the House buildings and we believe it will cost approximately \$2 million to purchase natural gas and burn natural gas to create steam for the House office buildings' equivalent.

Chairman Feinstein. That is just for the House?

Mr. Ayers. Yes, ma'am.

Chairman Feinstein. Which we share, do we not, in that? Or does that go just to the House?

Mr. Ayers. Certainly, you know, you cannot really separate--

Chairman Feinstein. Right. Exactly.

Mr. Ayers. --the steam from one place to another place, like you really cannot separate the electrons of electricity from one to another. But ultimately, they appropriated collectively the \$2 million to enable us to do that.

So moving forward in terms of where I think we need to go with the Capitol Power Plant, we are looking at a wide variety of things. Just last week--

Chairman Feinstein. Let me stop you.

Mr. Ayers. Yes, ma'am.

Chairman Feinstein. We have not appropriated any money, and we are both appropriators. Now, the question then that comes of this, Should the Senate be appropriating this money? If so, how much and specifically for what? And is it the most cost-efficient way of doing it? Or do we just leave it kind of where it is with the House moving and the Senate not moving?

Mr. Ayers. I think we have some additional capacity to burn natural gas at the Power Plant, but we are very close to achieving the maximum amount we can burn without a significant investment in equipment upgrades to the tune of about \$6 or \$7 million.

Chairman Feinstein. So, in other words, changing the fuel mixture does not do it. Is that right? Are you saying that?

Mr. Ayers. No, ma'am. I think changing the fuel mixture from coal to natural gas would be a good thing to do. But we are very close to our maximum capacity of burning natural gas now. So to burn more natural gas instead of coal, we would need to make some equipment upgrades, which are about \$6 or \$7 million to do so.

Chairman Feinstein. You said \$7 million?

Mr. Ayers. Yes.

Chairman Feinstein. Now, so you believe--are you saying that is the most cost-effective thing we can do, is spend the \$7 million?

Mr. Ayers. No. That is not necessarily the most cost-effective thing—

Chairman Feinstein. What is the most cost-effective thing to do?

Mr. Ayers. We believe the most cost-effective thing we can do is to move towards a co-generation system at the Plant whereby we are generating some electricity that we can use for emergency purposes, and when that need is not there, we can sell that electricity back to Pepco, our utility provider. But we have the infrastructure available to create steam now, and using much of that excess steam to help us generate electricity, we think, is the most cost-effective approach at the Capitol Power Plant, though that does come with a very significant investment of well over \$200 million to do so.

Chairman Feinstein. How is that cost-effective?

Mr. Ayers. Over the long term, it is cost-effective.

Chairman Feinstein. Well, I think the likelihood of \$200 million is—

Senator Bennett. That is a tough sell.

Chairman Feinstein. A very tough sell. Now, apparently--would it make sense or does it not make sense to ask you to provide a cost/benefit analysis of changing the fuel mixture? And what would the timetable of such a study be?

Mr. Ayers. I think that is a great idea. I think GAO had recommended that before we make any additional changes to our fuel mixture, that we do such a lifecycle cost analysis and provide that to the Congress. I think 30 days is a reasonable period to do that.

We are looking at some of those things now. We have recently completed an analysis of fuel oil, of changing our distillate oil to a B20 blend, and we think that is a viable option and a cost-effective option for us to pursue as well.

Chairman Feinstein. Well, both the Ranking Member and I believe that that should be done as a first step. Is that sufficient for you to go ahead and do it?

Mr. Ayers. Absolutely.

Chairman Feinstein. So we would have a report back in 30 days?

Mr. Ayers. Yes.

Chairman Feinstein. Your administration will be judged on the promptness of the report.

[Laughter.]

Mr. Ayers. We have a great team.

Chairman Feinstein. All right. Thank you.

Senator Bennett?

Senator Bennett. Thank you, Madam Chairman.

I have kind of a holistic view of this whole thing, and the Chairman's exchange with you, Mr. Ayers, kind of highlights some of the concerns that I have. May I formally for the record join with the Chairman in congratulating you on the job you have been doing with respect to this. The reductions of the size you have described are significant and demonstrate your commitment and your vision, and I think we ought to have that formally on the record from both of us.

Mr. Ayers. Thank you.

Senator Bennett. Now, I have a little bit of a concern that we may be focusing on greening the Capitol in such a way that makes us feel good but, in fact, simply shifts the carbon footprint someplace else. And if we are going to shift from coal to natural gas and spend \$200 million to do it and feel really good about that with the cost of the natural gas four times that of the coal, yet up in the stratosphere, or wherever the measure is made, as you say, nobody measures where the electrons go or come from, nobody measures, gee, the fact that the U.S. Capitol at this significant expense is now x percentage greener than it was does not really make any difference in the overall scheme of things if you have simply shifted the carbon from one place to the other. And to say, well, we are not going to buy any coal, we are only going to buy natural gas, which presumably raises the price of natural gas that much further, puts it that much further out of the reach of other people who will then respond to the economic incentive and start burning coal where they are now burning natural gas, we have not accomplished very much. We may ourselves feel better, but in the overall scheme of things, we have not accomplished very much.

Let me ask you, how much have we spent in carbon credits, emission credits? And what do we know that we have bought?

Mr. Ayers. Well, just to correct Mr. Dorn's testimony--and I know that he would agree.

Mr. Dorn. I agree.

Mr. Ayers. The Architect of the Capitol has not purchased any carbon credits. We have not done that, and we do not have a plan to do so. We are awaiting an analysis that we know that the Government Accountability Office is currently working on to investigate that entire issue, with the report due out in several months, before we proceed and make any decisions in that regard.

Senator Bennett. Okay. Well, that reassures me. From Mr. Dorn's testimony, it says cut down demand, change the fuel mix, and purchase carbon offsets.

Mr. Dorn. That is correct, Senator Bennett. Actually, it was the House Chief Administrative Officer that--

Senator Bennett. Yes, I am very skeptical about carbon offsets. I could put it pleasantly, but I might as well just put it bluntly. The opportunities for scamming that thing are huge, and the question I have been unable to get anybody to answer for me when we have gotten into that area is: How do you know that the person who plants a tree in order to provide the carbon offset would not have planted the tree anyway? And, indeed, I have heard from some farmers who have said, "You know, I just got an insight into a major new income

stream for me, because as I was out planting trees, somebody came up and said, 'Can we buy the planting of your trees to sell as carbon offsets?'" And he said, "I would have planted the trees anyway, but now I can get some money for doing something that would have happened anyway." And when I raised that with some people, they say, "Oh, well, we are going to investigate that." We are going to have to be sure that there is, in fact, a real carbon offset rather than a scam.

I understand the House bought \$90,000 worth of carbon credits last year. I am glad to know the Senate has not, and I would like to know what the House got for their \$90,000 and how they were able to trace it.

Mr. Ayers, you are talking about replacing light bulbs. Just as a matter of curiosity, do you replace the fluorescent bulbs when they burn out--or, pardon me, the—

Chairman Feinstein. Incandescent.

Senator Bennett. The incandescent bulbs when they burn out, or do you go through and take them all out at one time and replace the whole building with fluorescent bulbs?

Mr. Ayers. Senator Bennett, it is the latter. Generally speaking, we will go through and remove all of the incandescent bulbs and replace them with compact fluorescent bulbs at one time.

Senator Bennett. I can understand from a labor standpoint that is by far the most efficient. You are throwing away things that are still useful. Have you done any kind of a cost comparison, or is the amount of money involved de minimis to the point that it is not worth making an analysis?

Mr. Ayers. Well, first, of course, we recycle all of those fluorescent tubes as well-- Senator Bennett. You mean incandescent tubes.

Mr. Ayers. Incandescent, yes. We recycle all of those, so that is important.

Senator Bennett. Okay.

Mr. Ayers. And on top of that, I would think it is with--or considering that, I would think the costs are negligible.

Senator Bennett. Okay, good.

Ms. Carroon, I am glad to hear that old buildings still have a benefit in this regard. I like old buildings--well, some old buildings. There are some old buildings that are really ugly and should have been torn down a long time ago for architectural reasons. But the Capitol

clearly is not one of them, and we have, as your organization says, a significant responsibility to preserve it.

As we address the question of further building needs for the Senate--and the Chairman and I have had a session on this with people from the Architect of the Capitol's office--we face the challenge of integrating that into the campus here so that it is not particularly jarring architecturally, and that means building a building that has kind of a patina or a veneer, if you will, of the architectural look of an older building, and at the same time getting the greatest efficiency.

Is your organization prepared, as we move down that direction, to give us some help and advice?

Ms. Carroon. Oh, absolutely. What we find is that the new technologies, actually, in the last few years are making it easier to integrate into historic buildings. They are not as intrusive, for instance, as fluorescent lights. There is more understanding that lighting does not necessarily need to be on the ceiling. You might have something that appears to be a historic fixture, but the actual lighting is at the tabletop level, so there are less dramatic changes.

We are also finding that the computer technologies that allow things like modeling for understanding of fire protection and codes make drastic interventions to make buildings safer and more usable less necessary. We have a better understanding of how buildings work. And we are rediscovering how buildings work, such as the National Building Museum with a natural ventilation system and systems - such as operable windows. Many of your questions have actually been speaking to one of the key issues in understanding how to make a greener world, which is about lifecycle analysis, not lifecycle costing, but a recognition that everything you do has an impact and a cost. And so, yes, it is a good thing to perhaps replace a faucet with a new 3-second aerated faucet that is timed, but that faucet took energy and had an impact. We have a building culture where it is cheaper for a contractor to take out something, like a window that has been in place for 100 years, and put in a new window because it takes him 2 hours to do it, but that new window might have come from Minneapolis. It will have taken energy to make--it might use vinyl. It might have created significant water waste, and it might only last for 20 years versus the 100 or 200 years of the original window.

Understanding and shifting our economy so that lifecycle analysis becomes part of our evaluation is a significant issue in how we green buildings, and it is getting easier. Some of the big gestures that are being talked about are becoming more economic, such as mechanical systems and a recognition within buildings that the comfort level does not have to be the entire room, it just has to be the lowest 8 feet of space and how do you do that? There are wonderful case studies that are rolling out every day. One of them is the Colorado Capitol, which is a LEED Existing Building project, meaning that it was never vacated, it was just essentially tweaked or renovated while it was occupied, with significant demonstrable benefits

to its consumption of energy and the comfort level of people.

The National Trust, of course, stands ready, as does the entire architecture and design community, to help in this kind of effort, which takes a team that involves many different kinds of specialists and a continual re-evaluation of how things are being done. But that demonstration is happening here by things that the Architect of the Capitol is speaking to and things that you have already implemented. It is very, very exciting. And for me, as someone who has watched for this tipping point and pushed for it, it is very energizing to see that great things are happening and more great things will happen in a thoughtful way.

Senator Bennett. Thank you very much for that.

Yes, Mr. Ayers?

Mr. Ayers. Senator Bennett, if I could just reinforce what Ms. Carroon said, that in terms of old buildings, between the Russell, the Dirksen, and the Hart Buildings, the Senate's main buildings, we measure those buildings in terms of energy intensity, and that is btu's per square foot. The Russell Building is the most efficient building, and the Hart Building, the newest building, is actually our most inefficient building--actually contrary to what many people would have thought, but reinforces what Ms. Carroon has said about old and historic buildings.

Senator Bennett. Well, I will not get into the history of the Hart Building, Pat Moynihan's comments and so on. But one last comment, Madam Chairman.

As I look around the Capitol Complex, we have an awful lot of asphalt for parking, and that generates a great deal of heat, reflects a great deal of heat. And as we look down the road for the Capitol Complex, we are talking about some underground parking. Do you have a sense, Ms. Carroon, about that impact in terms of the environmental consequences of a lot of asphalt?

Ms. Carroon. Well, reducing the heat island effect is very, very significant and is part of the combined benefit that is identified in the LEED system for Site. It is also part of the drive in cities, like Chicago, to put green roofs on many of their existing historic buildings, which have flat roofs. So it has a very significant change in the environment, but I am probably the wrong person to ask because I personally dislike cars intensely and feel that the greatest benefit that we have in places like Washington and in many historic communities is that we can reach them and travel in them through public transportation. We interact. We walk. We have a healthier, more stimulating lifestyle.

I applaud putting the parking underground, but I would applaud more completely using Zip Cars and bicycles and public transportation.

Senator Bennett. I better not get any farther than that.

[Laughter.]

Senator Bennett. Thank you very much.

Chairman Feinstein. Thank you. I was just looking at this room, which is one of the more beautiful rooms, I think, in this building. And, you know, at one end is the Santa Maria, and this is painted by a very well known American artist, a 19th century artist, and at the other end the USS Constitution, and these light fixtures, which came with the building, which have always been electric. And I asked the staff, Did you put fluorescent in? And they said yes, they tried them, but even the lowest wattage of fluorescent was so strong and so white that you really could not see the rest of the room clearly. And so they decided to go back to the electric fixtures. And, of course, this is one of the problems that one has in a great old, historic building like this.

But I wanted to ask this question: I have been told that it makes a considerable difference in electricity consumption as to whether a computer is on sleep overnight or turned off. As a matter of fact, I was told in California it was about 6 percent of all electricity costs. Has that been looked at? What is the difference? Mr. Ayers, can you answer that?

Mr. Ayers. No, Madam Chairman, I do not think I can, certainly in terms of specifically what the difference is. But, I can tell you that within the Architect of the Capitol organization, we manage our own information technology infrastructure and have put the programs in place that not just put computers in sleep mode after a few minutes, but actually takes it a step further and turns many of them off. So we think we have a good policy and practice in place for our organization. I do not know if any of my colleagues know the specific difference between turning one off or not turning one off and what energy that may save. But I can certainly find that out for the record if my colleagues do not know.

Chairman Feinstein. Yes. Well, if anybody does know the difference, I would like to know it. But I would really like you, if you would, to take a look at that because, you know, candidly, there is no reason to leave a computer on sleep overnight when an employee goes home. And I have got to believe it is wasted electricity. So the question is how to quantify it, and if it is, as I was told in California, that the difference is 6 percent of energy costs across the board--of course, our State is so big--in the State, that is a whopping amount and hard to believe. So if you could do that, we might want some policy if it were worth it to mandate that all computers be turned off at night rather than left on sleep.

Mr. Ayers. Yes, ma'am.

Chairman Feinstein. I think that completes my questions, but let me just--I think the big issue is the Power Plant and coming to grips with the Power Plant. The House has taken action. We have not. I doubt very much that we will take action until we have all the facts.

You are going to do the study; you are going to get us the results within 30 days. That will give us some basis to look at this thing more completely.

I am wondering, other than fuel mix, if there are not some other options. Let me ask the GAO. Are there other options that have not been considered or have all the options--are they pretty much known by now?

Mr. Dorn. As far as the Capitol Power Plant goes, there are a number of options at the plant and elsewhere in the other buildings to still save energy and reduce your carbon footprint.

Chairman Feinstein. Can you run through those for us?

Mr. Dorn. One that comes to mind--and then maybe Mr. Ayers can jump in--would be replacing some of the existing chillers that are used to make chilled water to cool the buildings. You recently funded a project to do the west refrigeration plant expansion and put in some great new energy-efficient chillers, but there are still some old ones left that could be—

Chairman Feinstein. Do you know how many?

Mr. Dorn. I believe it is two, maybe three. Do you remember, Stephen?

Mr. Ayers. I think it is four old ones, actually.

Chairman Feinstein. Four.

Mr. Ayers. Yes, ma'am.

Chairman Feinstein. And what would the cost of replacement of those be?

Mr. Ayers. I would have to respond to that for the record. We have included in our fiscal year 2009 budget request design funds to begin that process, and I think Mr. Dorn is absolutely right, that would be one of the most important things we could do, is to replace that very old equipment with modern, energy-efficient equipment.

Chairman Feinstein. How much does it take to do the necessary feasibility work?

Mr. Ayers. I believe we have requested approximately \$1 million to begin the design work to make that happen.

Chairman Feinstein. We should look at that and see where that money is and see if we cannot help you out with that.

Senator Bennett. How much useful life is left in the ones you would replace?

Mr. Ayers. That is very difficult to predict. I have my Power Plant staff behind me. I suspect they would say it is in the very near future, which we would define as 2, 3, 4 years.

Senator Bennett. So if they are that close to the end of their useful life, it makes sense to replace them, regardless of the energy impact.

Mr. Ayers. Yes, sir, it does.

Senator Bennett. Yes.

Chairman Feinstein. Well, it seems to me that we ought to do it. So somebody could take that down. That is a good thing to do.

Mr. Dorn, you were suggesting other things or is that it?

Mr. Dorn. That is probably the biggest one in the Capitol Power Plant. There are other things that can be done there with motors and fans, and I think that the Plant personnel and Mr. Ayers, they are directing energy audits, and they are looking themselves to try to find these types of projects to reduce energy. I think reducing energy demand is the most cost-efficient way to reduce your carbon footprint.

Chairman Feinstein. Senator, this comes under a Committee that we have both headed, which is Legislative Branch Appropriations. Perhaps we could jointly write a letter to the Appropriations Committee, which will shortly be marking up, pointing this out, this testimony that we have received and urging that they commence a feasibility study of replacing--four chillers? Is that the definitive response?

Mr. Ayers. I am happy to work with the Committee staff to get the facts and help draft such a letter for you.

Chairman Feinstein. That would be excellent.

Do you have objection?

Senator Bennett. Not at all. Not at all. I remember when I became the Chairman of the Legislative Branch Subcommittee. I went to see the chillers, and they looked pretty old to me then, and that was over 10 years ago.

Chairman Feinstein. Good for you for going to see them.

[Laughter.]

Chairman Feinstein. I feel deficient. I did not go to see them. But we will write that letter to the Committee, and it might even have some impact. Who knows? So we will try that.

Mr. Ayers, let me ask this question: Mr. Owens mentioned in his written remarks the creation of a working group to work on this issue. I am not sure whether that is a help or a hindrance. Sometimes it is, and sometimes it is not. What would you think?

Mr. Ayers. Madam Chairman, it is definitely not a hindrance. We have reached out with strategic partners like the Department of Energy. We have a good relationship with Carnegie Mellon University. I am, of course, a member of the Green Building Council, and I think this partnership is a great idea. The more minds that are on this to help us fix this problem and address this issue, the better. So I would welcome the opportunity.

Chairman Feinstein. This would be a volunteer effort, right, that would be set up in an informal advisory way that you could do yourself, correct?

Mr. Ayers. Yes, ma'am.

Chairman Feinstein. So would you intend to do it?

Mr. Ayers. Consider it done.

Chairman Feinstein. Thank you. Well, we are three for three so far.

[Laughter.]

Chairman Feinstein. Thank you very much.

Do you have any other comments, Senator?

Senator Bennett. No. I have a question that Congressman Lungren has asked me to submit for the record, and I would give it--I believe it would go to Mr. Ayers, but I would like to put that in the record.

Chairman Feinstein. That question will be sent. So ordered.

[The question follows:]

/ COMMITTEE INSERT

Senator Bennett. Other than that, I thank the witnesses. I think it has been a very good panel and very helpful, and we are proceeding, I think, in a logical way rather than a knee-jerk kind of reaction to this. And that has been my concern, that we get so focused--as I said earlier, we get so focused on let's make sure the Capitol is green that we do not recognize, wait a minute, there are other things that have an impact here, and we should do it in a sensible fashion. Again, I compliment Mr. Ayers for the manner in which he has gone about it, and we need to keep going in that direction.

Chairman Feinstein. Well, I agree with you wholeheartedly, Senator, and we will look forward to receiving your report in 30 days and working with you, and please feel free to call either one of us if you have any ideas or thoughts.

I would like to thank all members--Mr. Owens, thank you for your suggestion, and Ms. Carroon, and the GAO, we always appreciate your attendance and your excellent analyses and reports. So, lady and gentlemen, thank you very much, and if I can find the gavel here, the hearing is adjourned.

[Whereupon, at 11:10 a.m., the Committee was adjourned.]